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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,335	10/01/2003	Fredrik Solhage	ANO 6277 US1/3166DIV	6520

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Michelle J. Burke
Akzo Nobel Inc.
Intellectual Property
7 Livingstone Avenue
Dobbs Ferry, NY 10522

EXAMINER	
CORDRAY, DENNIS R	

ART UNIT	PAPER NUMBER
1731	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/676,335	SOLHAGE ET AL.	
	Examiner	Art Unit	
	Dennis Cordray	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 31* is/are pending in the application.

4a) Of the above claim(s) *16-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15, 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's amendments, filed 9/14/2006, have overcome the rejections of claims 1-15 under 35 U.S.C. 102(b) and 35 U.S.C. 103(a). Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as detailed below. In addition, upon reconsideration, a previously withdrawn rejection is reinstated with more detailed explanation.

Applicant has argued that Persson et al does not describe a polysaccharide having a first substituents having an aromatic group and a second substituents having no aromatic group wherein the molar ratio of the first substituents to the second substituents is from 1:10 to 10:1. As detailed below, Persson et al discloses embodiments wherein the polysaccharide is first made hydrophobic by attaching nonionic substituents aromatic groups (page 4, line 34 to page 5, line 4), then cationized by attaching substituents having no aromatic groups (page 5, lines 17-21 and the disclosure of U.S. Patent No. 5463127, col 1, lines 7-10, the teachings of which were incorporated by reference). Similar embodiments are taught by Lindgren et al (col 9, lines 14-16 and 40-51 and the disclosure of U.S. Patent No. 5463127, col 1, lines 7-10, the teachings of which were incorporated by reference). The degree of cationic substitution, degree of aromatic substitution and degree of anionic substitution of the polysaccharide are discussed in detail in the rejections below and fully support ratios of substituents containing an aromatic group to substituents containing no aromatic groups encompassing the claimed ranges.

It is the examiners belief that, since specific embodiments are disclosed in the references of cationic polysaccharides having both substituents with aromatic groups and substituents with no aromatic groups, the instant invention is disclosed with sufficient specificity to be anticipated by the referenced prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-10, 13-15 and 31 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as unpatentable over Persson et al (WO 99/55964).

Persson et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with hydrophobic groups, which can be aromatic groups, and can additionally have substituents with nonaromatic cationic or anionic groups (page 2, lines 2-5; page 3, line 26 to page 4, line 23). The hydrophobic group is "preferably a group selected from an alkyl or aralkyl group, e.g. benzyl and phenylethyl groups" (page 4, lines 17-20). Thus aromatic groups in particular are recited. Forming and dewatering the suspension on a wire is disclosed (page 2, lines 9-10).

The cationic polysaccharide is preferably a starch or guar gum (page 2, lines 30-31). In some embodiments, the cationic polysaccharide is first hydrophobically modified using a nonionic aromatic agent, such as a benzyl halide (first substituent), then cationized using cationic agents (second substituent) known in the art (page 4, line 34 to page 5, line 2; page 5 lines 17-24), such as those disclosed in US Patent No. 5463127 (the teachings of which were incorporated by reference), which teaches in col 1, lines 7-10 that "Halohydroxypropyltrialkylammonium halides are known to be useful as intermediates used in modification of natural and synthetic polymers, particularly in production of cationic polysaccharides, e.g. starch." Thus the first substituent can contain the aromatic group and the second substituent containing no aromatic group can be that of general structural formula (II). In other embodiments, the aromatic group can be added by a cationizing species of the general structural formula (I), such as N-dialkyl-N-aralkyl ammonium halide or N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (page 5, lines 2-17). The latter species contains the claimed benzyl group.

The cationic polysaccharide can have anionic substituents as well (page 4, lines 24-29). The degree of cationic substitution (DS_C) ranges from 0.01 to 5, with a preferred range of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23 (calculated using a molecular weight for the polysaccharide of 162), the disclosed ranges encompassing the claimed range for the broader limits and lying within the claimed range for the preferred limits. The degree of aromatic substitution (DS_{Ar}) can be from 0.01 to 0.5, with a preferred

range of 0.025 to 0.2, and the degree of anionic substitution (DS_A) can be from 0 to 0.2, with a preferred range of 0 to 0.05. Using the disclosed ranges DS_C, DS_{Ar} and DS_A, the molar ratio of cationic or anionic substituents having no aromatic group to substituents having an aromatic group can be from 1:70 to 50:1 using the broader limits and from 1:8 to 8:1 using the preferred limits, which encompasses the claimed ranges.

Persson et al discloses the papermaking process further comprising recirculating the white water and adding fresh water up to 30 tons of fresh water per ton of dry paper produced (page 10, lines 5-7).

Persson et al discloses that an anionic material may be added, and that the anionic material can include silica based particles and clays of the smectite type (page 5, lines 25-33 and page 6, lines 7-8). Persson et al further discloses that the anionic material can be silica based particles with a specific surface area from 50 – 1000 m^2/g and which are present in a sol having an S value of 8 - 45% (page 6, lines 31-36). The ranges for surface area and sol S value significantly overlap and thus anticipate the claimed ranges.

Persson et al discloses adding a synthetic low molecular weight cationic polymer, which can be a polyacrylamide (page 7, lines 32-36 and page 8, lines 1-5)

The substituent having a non aromatic group claimed in Claim 6 is not expressly disclosed by Persson et al. However, person et al teaches in the background section that 3-chloro-2-hydroxypropyl trimethylammonium chloride is a known quaternizing agent for polysaccharides (page 1, lines 23-25), thus would have been an obvious cationizing agent to one of ordinary skill in the art.

3. Claims 1-9, 11-15 and 31 are rejected under 35 U.S.C. 102(a or e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lindgren et al (6818100).

Lindgren et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with an aromatic group, and can additionally have substituents with nonaromatic cationic or anionic groups (Abs; col 4, lines 33-41; col 8, line 19 to col 9, line 5). The aromatic group is "suitably an aromatic hydrocarbon group, including aralkyl groups, e.g. benzyl and phenylethyl groups" (col 8, lines 56-58). Forming and dewatering the suspension on a wire is a standard papermaking process and would be inherent or at least obvious to one of ordinary skill in the art.

The cationic polysaccharide is preferably a starch or guar gum (col 7, lines 54-64). In some embodiments, the cationic polysaccharide is first hydrophobically modified using a nonionic aromatic agent, such as a benzyl halide (first substituent), then cationized using cationic agents (second substituent) known in the art (col 9, lines 14-16 and 40-51), such as those disclosed in US Patent No. 5463127 (the teachings of which were incorporated by reference), which teaches in col 1, lines 7-10 that "Halohydroxypropyltrialkylammonium halides are known to be useful as intermediates used in modification of natural and synthetic polymers, particularly in production of cationic polysaccharides, e.g. starch." Thus the first substituent can contain the aromatic group and the second substituent containing no aromatic group can be that of

general structural formula (II). In other embodiments, the aromatic group can be added by a cationizing species of the general structural formula (I), such as N-dialkyl-N-aralkyl ammonium halide or N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (col 9, lines 14-39). The latter species contains the claimed benzyl group.

The cationic polysaccharide can have anionic substituents as well. The degree of cationic substitution (DS_C) ranges from 0.01 to 5, with a preferred range of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23 (calculated using a molecular weight for the polysaccharide of 162), the disclosed ranges encompassing the claimed range for the broader limits and lying within the claimed range for the preferred limits. The degree of aromatic substitution (DS_{Ar}) can be from 0.01 to 0.5, with a preferred range of 0.025 to 0.2, and the degree of anionic substitution (DS_A) can be from 0 to 0.2, with a preferred range of 0 to 0.05 (col 8,line 64 to col 9, line 5). Using the disclosed ranges DS_C, DS_{Ar} and DS_A, the molar ratio of cationic or anionic substituents having no aromatic group to substituents having an aromatic group can be from 1:70 to 50:1 using the broader limits and from 1:8 to 8:1 using the preferred limits, which encompasses the claimed ranges.

A second cationic polymer can be added as a sizing promoter, and can be a cationic polyacrylamide (col 7, line 54 to col 8, line 5). In a preferred embodiment, an anionic polymer, which can be an organic step growth polymer that is a naphthalene sulfonate, can also added as part of the sizing dispersion (col 6, line 62 to col 7, line 2; col 12, lines 45-50). Other materials that can be added are anionic clays of the smectite type, anionic silica based particles, and low molecular weight organic polymers (col 14,

lines 47-58). The process comprises recirculating white water and introducing fresh water in an amount of less than 30 tonnes per tonne of dry paper produced (col 15, lines 29-42).

N-(3-chloro-2-hydroxypropyl-N-benzyl)-N,N-dimethylammonium chloride is recited as a particular material for introducing the aromatic group to the polysaccharide and corresponds to one of the substituents of Claim 6. The other substituent in Claim 6 is not expressly disclosed by Lindgren et al, but is encompassed by the general disclosure of a halohydroxypropyl trialkylammonium halide (col 9, lines 26-27) and would have been obvious to one of ordinary skill in the art as a functional equivalent.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindgren et al in view of Persson et al (WO 99/55964).

Lindgren does not disclose the surface area or S-value of the silica based particles.

Persson et al discloses a process comprising similar polymers and anionic silica based particles with a specific surface area from 50 – 1000 m^2/g and which are present in a sol having an S value of 8 - 45%(page 6, lines 31-36). The ranges for surface area and sol S value significantly overlap and thus anticipate the claimed ranges.

The art of Lindgren et al, Persson et al and the instant invention is analogous as pertaining to the addition of cationic polysaccharides containing both aromatic and non-aromatic substituents to a papermaking suspension. Due to the similarity of the processes of Persson et to and Lindgren et al, it would have been obvious to one of

ordinary skill in the art to obtain the claimed values for the surface area and S-value of the silica based particles in the process or Lindgren et al in view of Persson et al as a functionally equivalent option.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DRC

ERIC HUG
PRIMARY EXAMINER